

Effect Of Handgrip Isometric Exercise On Level Of Blood Pressure Among Hypertensive Patients At Selected Hospitals Of City

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Abstract

A study conducted on 'Effect of handgrip isometric exercise on level of blood pressure among hypertensive patients at selected hospitals of city'.

The research design selected for the present study was Quantitative Evaluatory Approach. Study was conducted at selected hospitals. In the present study the sample comprises of hypertensive patients that fulfill the inclusion criteria of the study. Sample consists of 60 hypertensive patients (Experimental group: 30 hypertensive patients. Control group: 30 hypertensive patients). Non probability convenient sampling technique was used to select the samples. Result indicates that there is remarkable improvement in the systolic as well as diastolic blood pressure level among hypertensive patients after handgrip isometric exercise.

Conclusion:

In experimental group, average change in SYSBP was 2.8, 7.2 and 12.8 on day 1, day 4 and day 7 respectively. In control group, average change in SYSBP was 1.8, 1.3 and 1.9 on day 1, day 4 and day 7 respectively. The corresponding p-values were small (less than 0.05) for all the time points. Experimental group has significantly higher improvement in systolic blood pressure as compared to the control group. The handgrip isometric exercise was found to be significantly effective in reducing the systolic blood pressure among hypertensive patients.

In experimental group, average change in DIABP was 3, 6.3 and 11.3 on day 1, day 4 and day 7 respectively. In control group, average change in DIABP was 1.1, 1.5 and 1.7 on day 1, day 4 and day 7 respectively. The corresponding p-values were small (less than 0.05) for all the time points. It is evident that the experimental group has significantly higher effect in DIABP as compared to control group.

Introduction

Exercise should be regarded as tribute to the heart"

Increasing prevalence of hypertension in developing countries is of great concern. According to a report from the World Health Organization (WHO 2010), there was an estimated 972 million people with hypertension in the year 2000. 65% lived in developing world with the number predicted to grow to 1.5 billion by 2025. The increasing prevalence is well reflected in the increase in cardiovascular disease mortalities. This is especially in developing countries with high illiteracy rates.

"To enjoy the glow of good health, you must exercise"

Hypertension is a growing public health problem in many developing countries including Ethiopia. It is a silent killer and most patients are detected to have it incidentally when they are admitted to hospital for unrelated disease or subjected to pre-employment or preoperative medical checkups. Information on the prevalence of hypertension and its associated factors is to be considered vital to focus and improve prevention and control of cardiovascular diseases.

Several factors affect prevention, diagnosis, treatment and control of hypertension. The most important barrier to diagnosis is lack of knowledge and awareness on hypertension and its complications. Almost half of hypertension-related deaths can be averted with compliance or adherence to antihypertensive treatment. Patient education is a key component in the programs and interventions designed to control hypertension, so it is therefore important to assess the patients' knowledge and awareness of hypertension. Efforts to control hypertension have included improving public knowledge and awareness on the risks and complications of hypertension.

Background

Increased age is an established cardiovascular (CV) risk factor. Aging along with hypertension is a major risk factor for CV morbidity and mortality. The prevalence of hypertension in elderly ranges from 60 to 80%, and it is estimated that two of three individuals over 75 years of age suffer from hypertension. In the past, hypertension patients were refrained from resistance training, which was considered to cause vascular hypertrophy and thus elevating resting arterial pressure. However, studies in the last few decades showed that resistance training such as isometric handgrip exercise can significantly reduce arterial pressure.

As per World Health Organization report, about 40% of people aged more than 25 years had hypertension in 2008. World-wide, 7.6 million premature deaths (about 13.5% of the global total) were attributed to high blood pressure. About 54% of stroke and 47% of ischemic heart diseases world-wide were attributable to high blood pressure. Hypertension has been associated with increased risk of coronary artery disease and is an independent risk factor for cardiovascular and cerebrovascular diseases. An alarming rise in HTN projected by the Global Burden of Hypertension 2005 study and the GBD 2010 study portrays a grim picture for the Indian population. Beyond programs aimed at the prevention of hypertension, treatment of hypertension remains a challenge in many parts of the world. Looking at the existing burden of disease, the Indian Government has launched the National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke for prevention and control of disease at community level.

Need of the study

Research has proved hypertension to be accounting for 13% of heart failure resulting to morbidity in a study conducted at the Department of Medicine. High rate of hypertension has been associated with low levels of awareness as focus has been on communicable diseases until recently. As such, prevalence of hypertension is deadly and a risk to the population. However, risk factors attributing to this problem included sedentary lifestyle. The treatment of hypertension in developing countries is unaffordable for the average worker. This is due to the fact that, the lowest treatment pharmacologically is recorded to be 7.5-12% of the monthly income of the average worker. In effect, it is impossible for a better treatment pharmacologically. Thus, the need for understanding the disease and controlling it with preventive measures is the key to the reduction of high prevalence in developing country.

Hypertension is estimated to affect 1 billion people worldwide, and is associated with an increased risk of cardiovascular disease and all-cause mortality. The management of high blood pressure focuses on lifestyle modifications (i.e. diet, exercise, smoking cessation) and drug therapies. Despite these strategies, many patients are still unable to maintain or control their blood pressure within desired levels.

PROBLEM STATEMENT:

‘Effect of handgrip isometric exercise on level of blood pressure among hypertensive patients at selected hospitals of city’.

OBJECTIVES:

1. To assess the level of blood pressure before providing handgrip isometric exercise among hypertensive patients at selected hospitals.
2. To determine the effect of handgrip isometric exercise on level of blood pressure among hypertensive patients at selected hospitals of city.
3. To find association of pre intervention study findings with selected demographic variables.

Review of literature:

- a. Literature related to hypertension.

A Cross Sectional Study in Urban Varanasi. Hypertension is a major public health problem and important area of research due to its high prevalence and being major risk factor for cardiovascular

diseases and other complications. A community based cross-sectional study with multistage sampling design was conducted among urban population of Varanasi. A modified WHO steps interview schedule on 640 study subjects aged 25– 64years was used. Results showed the prevalence of hypertension was 32.9% (male: 40.9%, female: 26.0%). Higher odds of being hypertensive were found in male subjects, eldest age group, married subjects, subjects of upper socioeconomic status, illiterate subjects, and retired subjects. Tobacco and alcohol consumption, overweight, obesity, and abdominal obesity were also associated with hypertension. Out of the total hypertensive 211 subjects, only 81(38.4%) were aware about their hypertension status; out of those, 57 (70.4%) were seeking treatment and 20 (35.08%) had their blood pressure adequately controlled. Around one third of the subjects were hypertensive and half of the study subjects were pre-hypertensive in this area. The awareness, treatment, and control of high blood pressure were also very low.

b. Literature related to effect of handgrip isometric exercise on level of blood pressure.

A study conducted on Effect of isometric handgrip training on ambulatory blood pressure in patients with hypertension (ISOPRESS) Meta-analysis studies have demonstrated that isometric training with handgrip promotes reductions in clinical blood pressure, reaching 8 mmHg for systolic blood pressure and 4 mmHg for diastolic. However, the effect of this training modality on ambulatory blood pressure, which is better discriminant of cardiovascular risk than clinical BP, remains uncertain. Thus, the ISOPRESS Network, consists of researchers from Brazilian institutions of education and research, will conduct a multi-center study to analyze the effects of isometric handgrip training on clinic and 24-h ambulatory blood pressure in patients with hypertension. For this, each research center will conduct a randomized controlled trial with medicated patients with hypertension, of both sex. The participants will be randomized into two groups: isometric handgrip training group (HBT: n = 25 per center) and control group (CG: n = 25 per center). Subjects assigned to the HBT will train three times per week, four sets of 2-min isometric contractions (using alternate hands) at 30% of maximal voluntary contraction, during 24 weeks. Subjects randomized to the CG will perform stretching and relaxation exercises three times per week, during 24 weeks. The evaluations will occur in three moments: baseline, post-12 and post-24 weeks. The primary outcome will be ambulatory blood pressure, while clinic blood pressure and cardiac autonomic modulation will be analyzed as secondary outcomes. For data analysis, in addition to descriptive statistics, two-way ANOVA for mixed model will be applied for within and between groups comparison. The level of significance that will be adopted is $p < 0.05$.

Hypothesis

Ho: There is no significant effect of handgrip isometric exercise on level of blood pressure among hypertensive patients at selected hospitals of city. ($p=0.05$)

H1: There is significant effect of handgrip isometric exercise on level of blood pressure among hypertensive patients at selected hospitals of city. ($p=0.05$)

Materials and methods

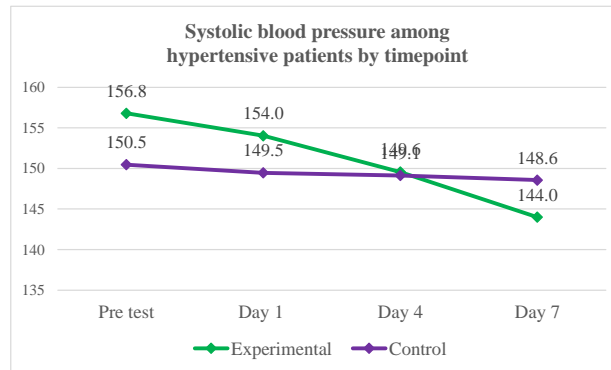
The research approach used for the study is Quantitative Evaluative Approach and Quasi-experimental Time Series Design is used for the study. Sixty samples (30-experimental group and 30-control group) selected by using convenient sampling technique. Raw data was collected and entered in a master sheet for the statistical analysis. It was interpreted using descriptive and inferential statistics.

VARIABLES

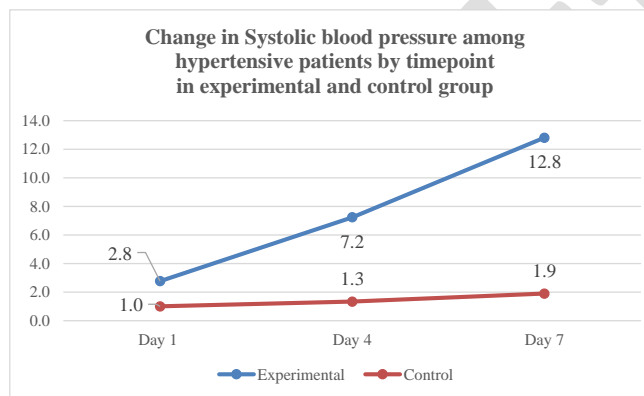
- I. Independent variable: Handgrip Isometric Exercise.
- II. Dependent variable: Level of Blood Pressure

Interpretation:

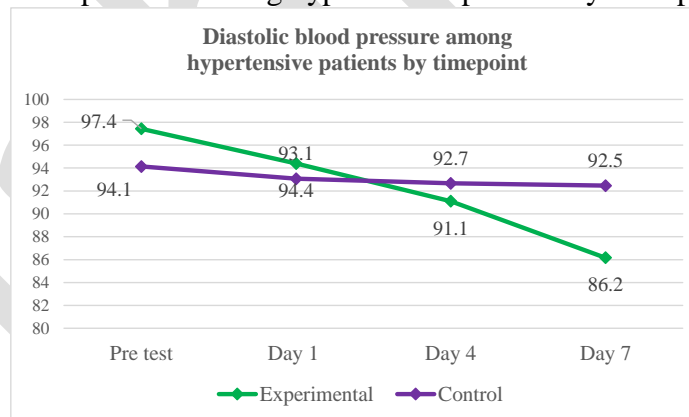
Graph No:1 Systolic blood pressure among hypertensive patients by timepoint.



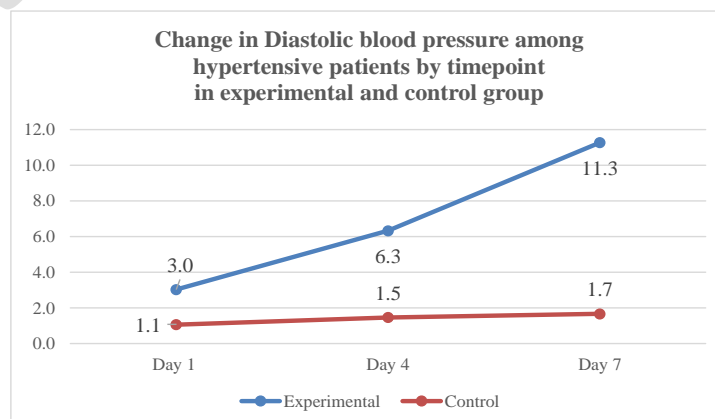
Graph No: 2 Change in SYSBP among hypertensive patients in experimental and control groups.



Graph No: 3 Diastolic blood pressure among hypertensive patients by time-point.



Graph No: 4 Comparison of change in DIABP among hypertensive patients in experimental and control groups.



Fisher's exact test for the association of SYSBP with selected demographic variables

Demographic variable		SYSBP		P-value
		Stage I	Stage II	
Age	41-50 years	18	10	0.599
	51-60 years	11	7	
	61-70 years	11	3	
Gender	Male	23	12	1.000
	Female	17	8	
Education	Illiterate	13	2	0.150
	Primary	9	8	
	Secondary & Higher secondary	14	6	
	Graduation and above	4	4	
Occupation	Unemployed	19	4	0.066
	Government employee	6	4	
	Private employee	12	6	
	Business & Others	3	6	
Habits	Smoking	2	6	0.106
	Smoking, Tobacco chewing	1	0	
	Smoking, alcohol consumption	2	1	
	Tobacco chewing	22	6	
	Tobacco chewing, Alcohol consumption	2	0	
	Alcohol consumption	3	2	
	No bad habit	8	5	
Duration of hypertension	0 – 3 years	29	16	0.835
	4 – 6 years	10	4	
	7 – 10 years	1	0	
Any medication used for hypertension	Yes	18	9	1.000
	No	22	11	

Since all the p-values are large (greater than 0.05), none of the demographic variables was found to have significant association with SYSBP of hypertensive patients.

Fisher’s exact test for the association of DIABP with selected demographic variables

Demographic variable		DIABP				P-value
		Pre-hypertension	Stage I	Stage II	Stage III	
Age	41-50 years	0	18	10	0	0.252
	51-60 years	0	13	4	1	
	61-70 years	1	11	2	0	
Gender	Male	1	25	9	0	0.790
	Female	0	17	7	1	
Education	Illiterate	1	11	3	0	0.919
	Primary	0	11	5	1	
	Secondary & Higher secondary	0	14	6	0	
	Graduation and above	0	6	2	0	
Occupation	Unemployed	0	17	6	0	0.398
	Government employee	0	8	2	0	
	Private employee	0	12	6	0	
	Business & Others	1	5	2	1	
Habits	Smoking	0	4	4	0	0.636
	Smoking, Tobacco chewing	0	1	0	0	
	Smoking, alcohol consumption	0	2	1	0	
	Tobacco chewing	0	21	6	1	
	Tobacco chewing, Alcohol consumption	0	2	0	0	
	Alcohol consumption	1	3	1	0	
	No bad habit	0	9	4	0	
Duration of hypertension	0 – 3 years	0	32	12	1	0.549
	4 – 6 years	1	9	4	0	
	7 – 10 years	0	1	0	0	

Since all the p-values are large (greater than 0.05), none of the demographic variables was found to have significant association with DIABP of hypertensive patients.

Conclusion:

As a lifestyle intervention physical activity and exercise can improve health through the management of blood pressure. Specifically isometric handgrip exercise has been prescribed as a lifestyle intervention to successfully reduce high blood pressure among hypertensive patients. In the study analysis, the handgrip isometric exercise was found to be significantly effective in reducing the systolic and diastolic blood pressure among hypertensive patients.

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